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ABSTRACT

This paper describes and reports results of a program aimed at improving performance of all students, K-12, through a program of sequenced objectives monitored with criterion-referenced tests. Target curriculum areas were mathematics, reading, and language skills. Nationally normed achievement tests were administered in a base year and each year thereafter. Over a 5-year period students registered a gain of a full year in each of the three curriculum areas. A 10-item reference list, several tables and graphs, and an addendum giving achievement test scores for a sixth year are provided. (Author/DCS)

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A SUCCESSFUL PROGRAM TO IMPROVE STUDENT PERFORMANCE

by
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Superintendent
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for presentation as a part of

WHEN WORLDS COLLIDE: SCHOOL-UNIVERSITY COOPERATIVE RESEARCH

Northwestern University Consortium

American Educational Research Association Annual Meeting
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ABSTRACT

A Successful Program to Improve Student Performance

A Paper Presented
by
Roy C. Turnbaugh
at the

American Educational Research Association
Annual Meeting, April 25, 1984

This paper describes and reports results of a program aimed at improving student performance of all students, K-12, through a program of sequenced objectives monitored with criterion-referenced tests. Target curriculum areas were mathematics, reading, and language skills. Nationally normed achievement tests were administered in a base year and each year thereafter. Over a 5-year period students registered a gain of a full year in each of the three curriculum areas.

A SUCCESSFUL PROGRAM TO IMPROVE STUDENT PERFORMANCE

In 1977 Community Unit School District Number 304 in Geneva, Illinois had just finished the second year of budget deficits. A plan to deal with deficits by increasing revenue had temporarily failed with the second consecutive failure of a tax-rate referendum. There was to be one more failure before a partial success in the final month of the calendar year on the fourth referendum effort, when citizens approved half the increase originally sought.

The budget for 1977-78 was balanced by reducing expenditures by ten percent, which in that inflationary period required program cutbacks of fifteen percent. One of the budget casualties was the assistant superintendent for instruction.

In the general feeling of crisis that pervaded the school district the board of education with the superintendent concluded that his responsibility for instructional leadership in a period of fiscal reduction and loss of his closest instructional assistant required a simple, cohesive emphasis that could enlist maximum voluntary support and cooperation from the professional staff and be easily communicated to win approval and support of parents and the general community.

As the austerity budget for 1977-78 was developed during the summer of 1977, the superintendent presented at public meetings of the board two brief reports on "curriculum consistency and continuity." These reports

were developed primarily in consultation with building principals, who were at this time more than ever conscious of their role as leaders of instruction. At our customary pre-school workshop for teachers in August "curriculum consistency and continuity" became the theme. By December a brief policy statement had broad support and was unanimously adopted by the school board. It reads as follows:

> It shall be the policy of the district to require provision for consistency and continuity in the planned educational experiences of students at each level of instruction and as students proceed from year to year.
>
> Major objectives shall be established for each year or course. These objectives shall include basic learning skills and techniques appropriately ordered in sequence. Consideration will be given to the learner's previous school accomplishments and what may reasonably be expected after completion of the course. Sequential objectives for areas such as reading, mathematics, writing and speaking shall be accompanied by adequate description of standards of achievement or expected levels of mastery.
>
> Motivation of students or consideration of individual differences shall not be neglected.

Teachers were continuing the effort that had begun in August. They were working in horizontal (grade-level) and vertical (K-12) committees. This took the form of writing and organizing objectives in reading, language, and mathematics. At the high school level much attention was paid to course descriptions, first sharpening the definition of the course and then trying to make the students' experience in the course closely coincide with the description given when they enrolled in the course. During the 1970's Geneva teachers, like many others, had planned in-service experience in writing behavioral objectives. Nevertheless, this work was difficult and went slowly. No special funds were allocated

to it. Illinois provides four "institute days" in the annual school calendar, plus as many as five in-service half-days. Our district uses four of these for parent-teacher conferences. The fifth was added to the institute days for the curriculum consistency and continuity program. Teachers gave additional time after the school day. The district passed a small tax rate increase at the end of 1977, but the generally lean approach has remained. The improvement plan had been developed by the staff and the board as a priority program to which everyone would contribute. That atmosphere has been preserved.

By the end of the second year (1978-79) much progress had been made. Teachers had much more information as to what others were doing in our district, there was a general atmosphere of improved teamwork, and progress had been made in stating objectives. An example is this list for kindergarten mathematics:

- Sorts, classifies and orders objects
- Composes objects to determine which is longer, shorter, larger, smaller, taller, shorter, heavier
- Recognizes the positions over, under, between, top, bottom, in, on, inside, beside, first, next, last, left, right, before and after
- Matches two sets to determine more than, less than, or as many as
- Matches sets of objects to numerals through 10
- Makes a set to match a set
- Counts to 31
- Counts objects
- Identifies and names numerals 0-31
- Identifies geometric shapes, square, triangle, rectangle, and circle
- Understands the use of the calendar
- Understands the clock as a measurement of time
- Uses non standard units to measure objects

Nevertheless the district had reached a higher state of readiness and there was impatience for a faster rate of progress. Key people in the

district in responding to the dual pressure of fiscal limitations and educational improvement efforts had consciously adopted a position that has been recently expressed by Weick (1984):

> A small win is a concrete, complete, implemented outcome of moderate importance. By itself, one small win may seem unimportant. A series of wins at small but significant tasks, however, reveals a pattern that may attract allies, deter opponents, and lower resistance to subsequent proposals. Small wins are controllable opportunities that produce visible results.

Continuation of progress required a faster, more convenient way of clarifying objectives and quantifying results not only, as Weick indicates, to make them visible but also for various other reasons that were becoming more imperative.

Bloom (1976) says:

> Under highly sequential arrangements of learning tasks, the most critical tasks are likely to be the early ones in the sequence, since if these are not learned adequately (or to some criterion) the student is likely to have great difficulty with all the later tasks.....That is, uncorrected difficulties on the first task are likely to be compounded by more uncorrected difficulties on the second task, and by even more difficulties on the third task.

Concerning reading Chall (1983) writes:

> Each successive stage has a characteristic structure, and it absorbs the characteristics of the previous stage. Each successive stage is more varied and complex - and demands of the reader more complex reactions - from word recognition to literal comprehension, to highly analytic and critical reading.

After two years of concentrated local effort the superintendent sought expert help in clarifying objectives and providing competent measurement to provide teachers and students with feedback on accomplishment. In

1979 John W. Wick was leaving a stint as director of the Department of Research and Evaluation of the Chicago Public Schools to return to Northwestern University. He was enthusiastic about what the Geneva schools had underway and had at his disposal or had the ability to design and produce what was needed to continue and accelerate the Geneva improvement program. Materials needed were primarily detailed objectives and criterion referenced tests.

Teachers at the pre-school workshop in 1979 began a cyclical process which is now in its fifth year. The process includes these elements:

1. Achieving consensus among teachers on when objectives in reading, mathematics, and language arts are to be first introduced. This was done initially by sorting objectives first in grade level groups and then in groups of overlapping grades.

2. Communicating objectives and placement of objectives clearly to teachers.

3. Gathering data throughout the year to provide feedback for teachers and students and to provide information for annual review of objective placement and mastery. This data comes from short, criterion-referenced tests.

4. Annual review of the data to provide recommendations for changes and improvements. This has been done after the end of the school year using one teacher from each grade with departmental representatives from middle school and high school. Three days of teacher time has been found adequate.

An Entering Mastery test is administered near the opening of school each year. This test is based on the objectives stated for mastery the previous year. That is, entering fourth grade students are tested on objectives stated for mastery in fourth grade, and so on. Results are used for planning the instructional program for the early part of the year. Little effort is made to monitor teacher activity, except for urging that where less than 10% of a class has not mastered, teachers should attempt individual remediation and referral to the normal support resources of the school,

such as Learning Disabilities resource teachers and remedial reading teachers. If the percentage of non-mastery is between 10% and 40% teachers are urged to use class grouping with special effort to bring the minority to mastery. If non-mastery exceeds 40% teachers are urged to review or teach the entire class.

Geneva classes ordinarily have three or four reading groups, perhaps fewer after third grade.

In initial placement of objectives teachers were told, "You are the experts." Opinions of administrators or Professor Wick were not stated. Each year the predominant change in placement of objectives is to move to an earlier year. This is based on convincing evidence of student accomplishment. An increasing problem has been textbooks. Obviously as student accomplishment improves, textbooks customarily adopted are less appropriate. Some textbooks, especially reading materials, have now been moved to earlier years.

No changes have been made in the school day, nor in the allocation of time to curricular areas. Reading, mathematics, and language arts receive the same time allotment as in 1979, or 1977. The effort has been to improve learning efficiency by more appropriate curriculum alignment, frequent feedback to teachers and learners, and early attention to mastery of sequenced fundamentals.

Results

In 1979 the district began to use the 1978 edition of the Metropolitan Achievement Tests and continued the same battery through 1983. Thus 1979 can be considered a baseline year. Table 1 shows standard scores for grades 1-8 for the five years.

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TABLE 1

1979-1983 Standard Scores: Metro Testing

SUBJECT	YEAR	GRADE 1	2	3	4	5	6	7	8
Reading	1979	523	632	682	719	732	743	778	813
	1980	549	644	676	719	753	749	778	813
	1981	564	652	682	727	769	789	795	820
	1982	579	656	688	731	758	789	815	815
	1983	571	664	704	731	761	784	824	840
Math	1979	434	510	588	661	688	733	774	814*
	1980	442	517	588	656	713	741	769	814*
	1981	454	529	603	681	738	764	772	814*
	1982	466	535	603	681	738	761	792	814*
	1983	468	553	618	700	749	764	803	814
Language	1979	412	551	623	695	706	744	774	809
	1980	444	569	623	702	724	756	774	809
	1981	459	590	646	730	733	783	792	815
	1982	509	581	664	728	761	786	819	812
	1983	482	590	676	733	768	780	823	827

*Ceiling on eighth-grade mathematics test score.

By grade 4 students in 1983 had reached the score level attained by the next grade in 1979. In other words Geneva students in grades 4-8, by and large, demonstrated a gain of a full year beyond 1979 attainment. This was not done with a student population previously weak in performance. In 1979 the mean performance of Geneva students was at about the 60th percentile on national norms. By 1983 mean performance in grades 1-8 ranged from the 68th percentile to the 84th percentile in reading, math and language.

Figures 1-3 show this information graphically. Figure 4 is based on reading tests showing short-range gains as demonstrated by differentiated

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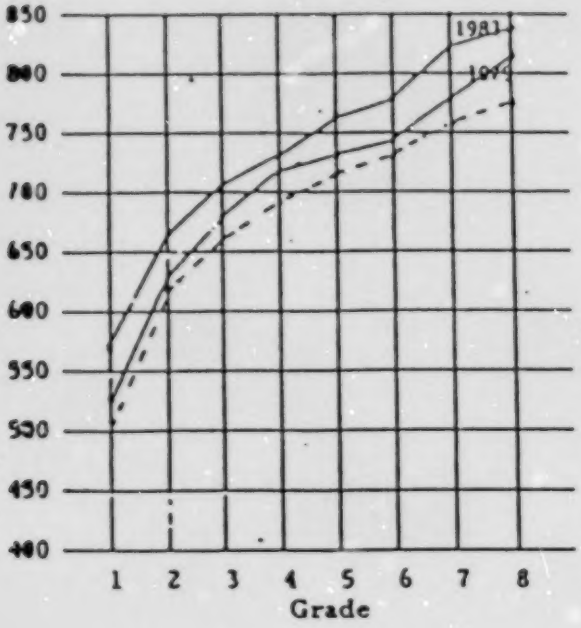
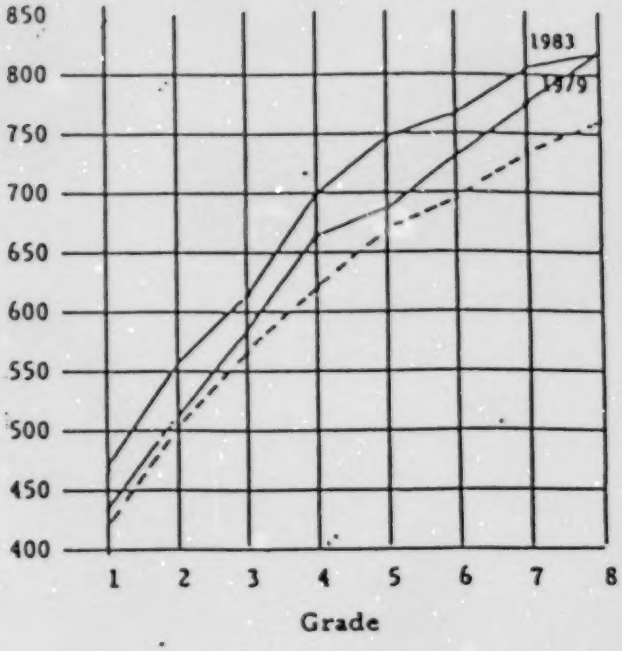
FIGURE 1



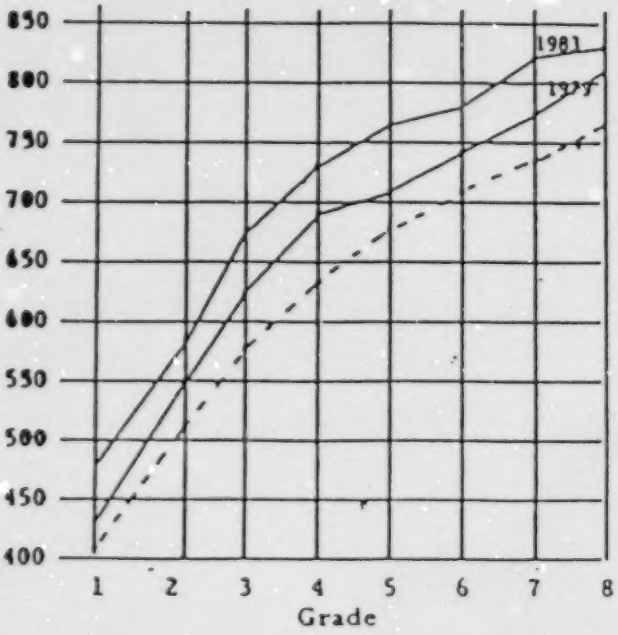
Reading Test Scores
1979 and 1983 Averages
(- - - shows national 50th percentile)

FIGURE 2



Math Test Scores
1979 and 1983 Averages
(- - - shows national 50th percentile)

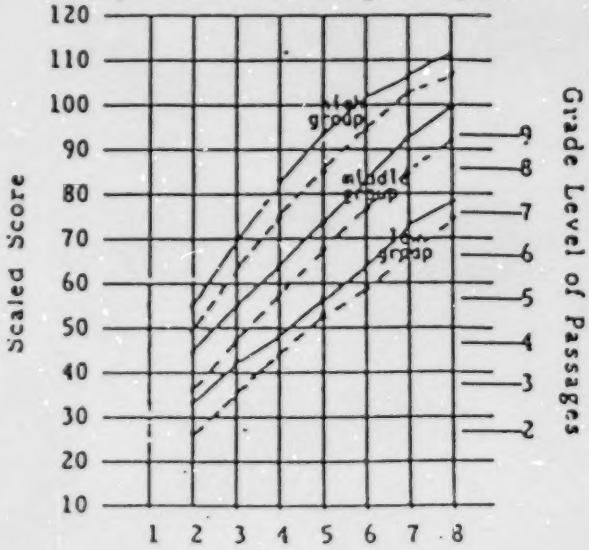
FIGURE 3



Language Test Scores
1979 and 1983 Averages
(- - - shows national 50th percentile)

FIGURE 4

Level of Reading Materials
By Which Students Are Challenged
(By Grade 4 Reading Group)



Key
---- = October, 1982
—— = February, 1983

reading tests administered to students divided by their own teachers into "high," "middle," and "low" groups.

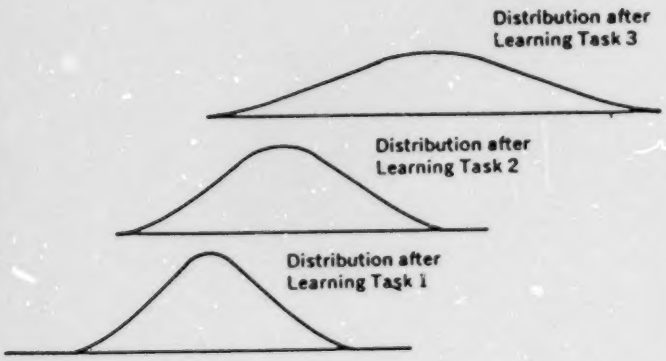
Bloom (1976) suggests another interesting way to look at student progress. He says:

> In any case, inadequate learning of each task should show more and more varied distributions of level of achievement, while adequate learning of each task should show similar or decreasing variation in level or rate of achievement.

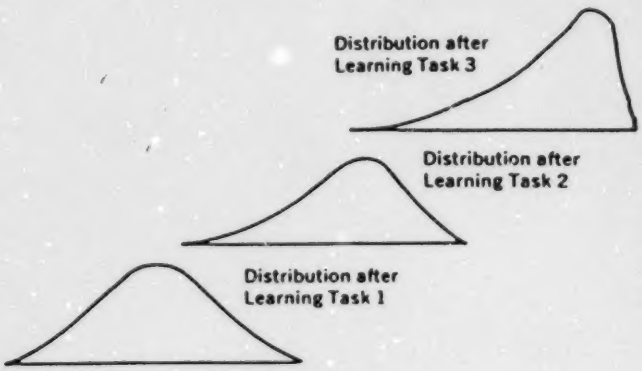
Bloom presents graphs somewhat like those below in Figure 5.

Figure 5

Inadequate Learning



Adequate Learning



An example of Geneva data can be presented which conforms to Bloom's theoretical construct. Figure 6 shows distribution of test scores for first grade students in 1979, fifth grade students in 1979, and fifth grade students in 1983 (mostly the same students who were first graders in 1979.

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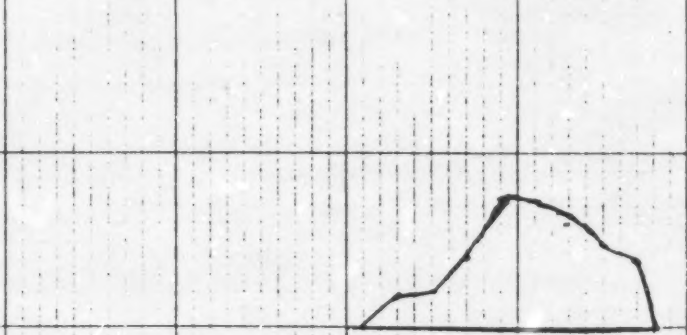
FIGURE 6

DISTRIBUTION OF MATH SCORES FOR THREE GROUPS



5TH GRADE 1983

Stanine	No.
1	0
2	2
3	1
4	6
5	22
6	18
7	24
8	25
9	32

5TH GRADE 1979

Stanine	No.
1	0
2	7
3	8
4	16
5	30
6	30
7	26
8	19
9	15

1ST GRADE 1979

Stanine	No.
1	0
2	3
3	9
4	12
5	27
6	29
7	29
8	9
9	8

Even in 1979 the Geneva curve appears to have shifted substantially as Bloom postulates for the adequate learning model, but the shift is much more marked in 1983.

In 1984 the district has shifted from the Metropolitan Achievement Tests to the Iowa Test of Basic Skills. There is a desire for a fresh instrument, indications of a somewhat better fit with Geneva objectives as they have been altered year by year, and expectation for more differentiation of

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achievement especially at the extremes for the Geneva student population.

The cost of this improvement program has been modest, equivalent to about one-half the salary of one teacher. Costs include consulting services from Northwestern University, costs of tests and production of materials for teachers, small stipends for a teacher coordinator in each building who assists other teachers while a full-time teacher himself or herself, and the costs of the annual June workshop. For those three days teachers who participate are paid at a nominal rate.

Summary

The goal of this program was to raise the performance level of students in the basic skills areas of the core curriculum. Unlike many other programs it has never been considered a minimum competency program or a basic education program. There has been no stress on minimum competency or basic education as over-riding priorities. Rather the emphasis has been on raising standards and improving efficiency in a portion of the curriculum to which all students devote a substantial portion of their time and to which the schools allocate a substantial portion of human and material resources.

By ordinary measures available the program has been successful. There is no indication that benefits from this program have yet been fully realized. There remains potential for further accomplishment in reading, math, and language. There is also potential for extension of the same approach to other curricular areas, and in Geneva this is beginning.

The significance of the Geneva improvement plan for other school districts lies in at least two areas:

1. Its philosophy is simple and logical; and it has substantial research support. It is close to the mainstream of informed public opinion.

2. It was not a pilot program with specially selected teachers or a select group of students. Geneva is a representative community. Its student population has no large disadvantaged group, but it is reasonably diverse. Educational expenditures are about average for Illinois.

In essence, the improvement plan stresses better curriculum alignment coupled with bringing objectives to mastery as soon as possible.

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ADDENDUM to "A Successful Program to Improve Student Performance" (AERA, 4/25/84)

In March, 1984, Geneva students in grades 1-8 took the Iowa Test of Basic Skills. Table 1a shows the information from the Metro battery for years 1979-83 converted to average percentile rank and adds the ITBS average percentile rank for 1984.

TABLE 1a

		GRADE							
	YEAR	1	2	3	4	5	6	7	8
Reading (Metro)	1979	58	56	64	62	58	53	62	67
	1980	68	62	60	62	68	56	62	67
	1981	73	66	64	66	74	74	70	70
	1982	77	68	68	68	70	74	78	68
	1983	75	72	76	68	71	72	81	79
(ITBS)	1984	74	78	82	77	72	65	66	75
Mathematics (Metro)	1979	58	52	60	68	60	65	68	72
	1980	62	56	60	66	70	68	66	72
	1981	68	62	66	76	80	77	67	72
	1982	74	65	66	76	80	76	75	72
	1983	74	74	72	83	84	77	79	72
(ITBS)	1984	74	81	82	80	83	73	76	75
Language (Metro)	1979	60	64	64	68	60	62	62	64
	1980	64	70	64	70	66	66	62	64
	1981	69	77	71	78	69	75	68	66
	1982	82	74	76	77	78	76	77	65
	1983	76	77	79	79	80	74	78	70
(ITBS)	1984	69	70	88	77	83	69	64	70

It is believed that the disadvantage of changing from one respected achievement test with national norms to a different one will be outweighed by the advantage of a test which more closely matches local objectives. It is also believed that, at least for our students, the ITBS is more difficult in the upper grades so 1984 scores do not represent a decline in student performance in grades 6-8 but rather a change of yardstick.

The following series of graphs with tabulated stanine distributions of student scores elaborates the point made by Figures 5 and 6. There has been a consistent shift of student achievement as Bloom indicates should be expected from more adequate learning in a sequence of learning tasks.

FIGURE 7

5TH GRADE 1979

Stanine	No.
1	0
2	7
3	8
4	16
5	30
6	30
7	26
8	19
9	15

8TH GRADE 1979

Stanine	No.
1	0
2	5
3	4
4	23
5	31
6	38
7	32
8	27
9	31

1ST GRADE 1979

Stanine	No.
1	0
2	3
3	9
4	12
5	27
6	29
7	29
8	9
9	8

3RD GRADE 1981

Stanine	No.
1	0
2	1
3	11
4	16
5	18
6	35
7	22
8	14
9	11

5TH GRADE 1983

Stanine	No.
1	0
2	2
3	1
4	6
5	22
6	18
7	24
8	25
9	32

8TH GRADE 1983

Stanine	No.
1	0
2	3
3	2
4	14
5	19
6	24
7	24
8	21
9	37

DISTIBUTION OF MATH SCORES FOR SIX GROUPS

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FIGURE 8

5TH GRADE 1979

Stanine	No.
1	0
2	1
3	8
4	22
5	26
6	32
7	30
8	18
9	13

8TH GRADE 1979

Stanine	No.
1	0
2	3
3	13
4	32
5	33
6	57
7	27
8	12
9	17

1ST GRADE 1979

Stanine	No.
1	0
2	1
3	7
4	5
5	27
6	33
7	34
8	12
9	6

3RD GRADE 1981

Stanine	No.
1	0
2	3
3	6
4	14
5	19
6	33
7	21
8	14
9	18

5TH GRADE 1983

Stanine	No.
1	1
2	1
3	4
4	6
5	14
6	32
7	34
8	10
9	27

8TH GRADE 1983

Stanine	No.
1	0
2	0
3	10
4	12
5	22
6	25
7	30
8	13
9	25

DISTRIBUTION OF LANGUAGE SCORES FOR SIX GROUPS